BEFORE

THE PUBLIC SERVICE COMMISSION OF SOUTH CAROLINA

DOCKET NOS. 2019-224-E and 2019-225-E

IN KE:	South Carolina Energy Freedom Act (House)
	Bill 3659) Proceeding Related to S.C. Code)
	Ann. Section 58-37-40 and Integrated)
	Resource Plans for Duke Energy Carolinas,)
	LLC,)
	and)
)
	South Carolina Energy Freedom Act (House)
	Bill 3659) Proceeding Related to S.C. Code)
	Ann. Section 58-37-40 and Integrated)
	Resource Plans for Duke Energy Progress, LLC)

COMMENTS OF SCCCL, SACE, UPSTATE FOREVER, NRDC, SIERRA CLUB AND CCEBA IN RESPONSE TO MODIFIED 2020 IRPs

The South Carolina Coastal Conservation League, Southern Alliance for Clean Energy, Upstate Forever, Natural Resources Defense Council, and Sierra Club ("Environmental Intervenors") and Carolinas Clean Energy Business Association ("CCEBA") (together "the Intervenors") are pleased to submit comments in response to the Modified 2020 Integrated Resource Plan ("IRP") filed by Duke Energy Carolinas, LLC, ("DEC") and Duke Energy Progress, LLC ("DEP") (collectively, "Duke" or "the Company") on June 28, 2021. These comments discuss the extent to which the Modified IRPs comply with the Commission's IRP Order, and recommend further remedies that the Commission may order to address the deficiencies in the Modified IRP.

I. Executive Summary

On June 28, 2021, the Public Service Commission of South Carolina ("Commission") required modification of the integrated resource plan ("IRP") filed by Duke Energy Carolinas,

LLC, ("DEC") and Duke Energy Progress, LLC ("DEP") (collectively, "Duke" or "the Company"). The Commission found "several deficiencies" in Duke's IRP and directed "a variety of changes to their modeling assumptions and methodologies" to be filed in a Modified IRP.¹ It also ordered "a number of more complex changes to Duke's methods for preparing an IRP, which Duke will be required to implement in future IRP filings."²

The Commission's IRP Order contained 23 ordering paragraphs ("OP"), eight of which were explicitly directed to be applied to the Modified IRP and two that were implicitly applicable to the Modified IRP based on other parts of the Order.³ A summary of these directives is provided in Table 1 below:

Ordering	Directive for Application to Modified IRP				
Paragraph					
1	Develop additional load forecast scenarios				
10	Natural gas forecast methodology changes				
11	Include third-party PPAs at \$38/MWh as selectable resource				
12	Assume PPA contract term of at least 20 years				
13	Include PPA pricing sensitivities at \$36/MWh and \$40/MWh				
14	Account for 2020 federal investment tax credit extension				
15	Use 100% single-axis tracking for future solar projects				
16	Use NREL ATB Low / Advanced figures for battery storage costs				

¹ Order No. 2021-447, *Order Requiring Modification to Integrated Resource Plans*, The Public Service Commission of South Carolina, Docket No. 2019-224-E And Docket No. 2019-225-E, at 1 ("Commission IRP Order").

³ Commission IRP Order Section VII. OPs 1, 10, 11, 13, 14, 16, 17, 19 specifically refer to the Modified IRP. OP 12 and 15 do not explicitly refer to the Modified IRP, but the text discussion supports their incorporation.

17	Assume 750 MW annual interconnection limit for solar and storage resources
19	Perform minimax regret analysis with updated assumptions

Table 1 - Commission IRP Order Ordering Paragraphs

Duke filed its Modified IRPs for DEC and DEP on August 27, 2021.⁴ However, the Company failed to remodel all of its portfolios with the assumptions and methodology updates ordered by this Commission. Instead, it bifurcated several portfolios, modeling some portfolios with the required updates while also presenting results using its original, rejected assumptions for its natural gas forecast and battery storage costs. This decision caused a cascading failure to comply with OP 19, as not all portfolios were properly updated, resulting in an inability to produce the minimax regret analysis ordered by this Commission.

In addition to these shortfalls, Duke introduced new, problematic restrictions that conflict with the intent of the Commission IRP Order. For instance, Duke implemented a completely arbitrary limit on the amount of third-party PPAs that the model could select.⁵ It also interpreted OP 6, related to modifications to its effective load carrying capability ("ELCC") methodology, as applicable to future IRP plans and did not perform new capacity attribution calculations for solar or storage for its Modified IRP.⁶

Instead of following the Commission's clear directives, Duke's haphazard approach to compliance with the Commission IRP Order renders flawed its Modified IRPs and adds an unnecessary layer of further complexity to this proceeding. Although the results of the Modified

⁴ Duke Energy Carolinas 2020 Modified Integrated Resource Plan ("DEC Modified IRP"), Duke Energy Progress 2020 Modified Integrated Resource Plan ("DEP Modified IRP").

⁵ DEC Modified IRP at 27.

⁶ DEC Modified IRP at 4.

IRP modeling are directionally consistent with those anticipated by the Intervenors, there are simply too many residual impacts from Duke's previously rejected assumptions and newly introduced limitations for the Commission to accept the results as being compliant with its Order.

Given the serious and consequential flaws in Duke's submission, the Commission should take the following actions with respect to the Modified IRP:

- Require Duke to model all portfolios with the Commission-required natural gas and battery cost forecasts
- Reject Duke's selection of Portfolio C1 as its preferred portfolio as that portfolio uses natural gas and battery cost assumptions the Commission rejected as unreasonable
- Require Duke to select a preferred portfolio that is in full compliance with the Commission's order
- Confirm that Duke changed its battery sizing methodology to conform with the costs from the NREL ATB report
- Require Duke remove the arbitrary 50% limitation on least-cost third-party PPAs

II. Summary of Duke's Modified IRP

Duke's original IRP contained six different portfolios, each examining a different policy scenario. The six scenarios are listed below in Table 2.

Portfolio	Description
A – Base Case w/o Carbon	Baseline case with no carbon pricing
B – Base Case with Carbon	Same inputs as Port. A but optimized with modeled carbon pricing
C – Earliest Practicable Coal Retirement	Shifts coal retirements earlier than Base cases and backfills with alternative resources

D – 70% CO2 Reduction – Wind	Targets a 70% CO2 reduction by 2035 with additional wind
E – 70% CO2 Reduction – SMR	Targets a 70% CO2 reduction by 2035 with additional small modular nuclear reactors
F – No New Natural Gas	Targets a 70% CO2 reduction by 2035 with no new natural gas capacity

Table 2 - Duke Portfolios

Each of the portfolios added substantial solar and natural gas capacity between 2020 and 2035. The amount of storage, wind, and offshore wind ("OSW") varied by portfolio. Table 3 below shows the original portfolio capacity additions by 2035 for the combined DEC and DEP regions.

Portfolio	Solar	Wind	OSW	Storage	NG
A	8,650	0	0	1,050	9,600
В	12,300	750	0	2,200	7,350
С	12,400	1,350	0	2,200	9,600
D	16,250	2,850	2,650	4,400	6,400
E	16,250	2,850	250	4,400	6,100
F	16,400	3,150	2,650	7,400	0

Table 3 - Duke Original Portfolio Capacity Additions (MW)

In its Modified IRP, Duke reanalyzed the six portfolios. It created two variations of the portfolios A through C (e.g., A1 and A2) that differentiated between the original and modified portfolio results. The "1" portfolios retained Duke's original, rejected natural gas price forecast

and battery cost assumptions, while the "2" portfolios utilized the Commission-directed updates for these values. All remodeled portfolios incorporated other required changes such as the increase in annual interconnection capacity, the extension of the ITC, and the shift to 100% tracking systems for solar.⁷ Duke produced nine modified portfolios in its Modified IRP: A1, B1, C1, D1, E1, and F1, and A2, B2, and C2. It did not produce a "2" version of the deep decarbonization portfolios D, E, and F. Table 4 below shows the updated capacity additions for each of the modified portfolios through 2035.

Portfolio	Solar	Wind	OSW	Storage	NG
A1	10,500	0	0	600	8,850
A2	10,350	0	0	1,600	7,950
B1	15,100	1,500	0	1,900	7,500
B2	15,600	1,500	0	3,400	6,100
C1	15,550	1,350	0	2,000	9,600
C2	15,600	1,500	0	3,400	8,250
D1	18,350	2,850	2,650	4,350	6,400
E 1	18,350	2,850	250	4,350	6,100
F1	18,350	2,850	2,650	7,350	0

Table 4 - Modified Portfolio Capacity Additions (MW)

One important point to note is that correcting Duke's prior assumptions related to extending the federal ITC, modeling 100% tracking systems, and including a PPA resource option, made solar resources more cost-effective than in Duke's original modeling. Similarly, the

⁷ DEC Modified IRP at 8.

updated and more accurate natural gas price forecasts and reduced battery storage cost values made natural gas generation less competitive compared to renewable generation or energy storage.

The results of the updated modeling thus produce several directionally consistent changes among the portfolios compared to Duke's original analysis. For example, the modeled results for all scenarios added more solar. Second, all "1" scenarios added less battery storage, perhaps due to the increase in capacity from solar generation. Third, all "2" scenarios added more battery storage and less natural gas generation, illustrating the shift in the relative economics of batteries and combustion turbines. Table 5 below shows the change from the baseline of each of the nine modified portfolios.

Portfolio	Solar	Wind	OSW	Storage	NG
A1	1,850	0	0	-450	-750
A2	1,700	0	0	550	-1,650
B1	2,800	750	0	-300	150
B2	3,300	750	0	1,200	-1,250
C1	3,150	0	0	-200	0
C2	3,200	150	0	1,200	-1,350
D1	2,100	0	0	-50	0
E 1	2,100	0	0	-50	0
F1	1,950	-300	0	-50	0

Table 5 – Changes in Modified Portfolio Capacity Additions (MW)

We note that the continued use of the System Optimizer model for capacity optimization will still understate the economic additions of battery storage resources because of its inability to

model generating resources on an hourly basis. Given the clear relationship between battery storage additions and new additions of gas-fired capacity, it can reasonably be expected that future use of capacity optimization models with hourly granularity, like the EnCompass model, will result in greater additions of storage and fewer additions of gas-fired capacity.

Importantly, the Commission required Duke to select a preferred portfolio in its Modified IRP.⁸ In response, Duke selected C1, the Earliest Practicable Coal Retirement portfolio that utilized Duke's original natural gas price forecast and battery cost assumptions – not the updated assumptions directed by the Commission's order (C2).⁹ Duke offered no satisfactory explanation for why it selected C1 instead of C2. Despite having modeled the C2 portfolio using Commission-approved values, Duke continues to argue that those values are too "aggressive" and does not seem to seriously consider the "2" portfolios—the portfolios that more fully comply with the Commission's Order—in its selection of a preferred portfolio.

III. Duke Fails to Comply with the Commission IRP Order with Respect to Natural Gas and Battery Storage Prices.

The Commission's Order is unambiguous with respect to its natural gas price forecast methodology and battery cost assumptions:

In its Modified IRP, IRP Update, and future full IRPs, Duke *shall* remodel its portfolios using natural gas pricing forecasts that rely on market prices for eighteen months before transitioning over eighteen months to the average of at least two fundamentals-based forecasts, as recommended by CCEBA Witness Lucas.¹¹

In its Modified IRP and future IRPs, Duke *shall* use the NREL ATB Low figures for battery storage costs. ¹²

⁸ Commission IRP Order at 85.

⁹ DEC Modified IRP at 13.

¹⁰ DEP Modified IRP at 19.

¹¹ Commission IRP Order, OP 10.

¹² Commission IRP Order, OP 16.

Despite this clear direction, Duke failed to remodel all its portfolios using these figures. Instead, it used updated natural gas and battery cost assumptions in only three of the six portfolios: the Base Case without Carbon Policy (Portfolio A), the Base Case with Carbon Policy (Portfolio B), and the Earliest Practicable Coal Retirement portfolio (Portfolio C). Although the Company did make some of the required changes such as increasing the share of tracking systems to 100% and extending the federal ITC in its the three deep decarbonization portfolios – 70% CO2 Reduction Wind (Portfolio D), 70% CO2 Reduction SMR (Portfolio E), and No New Natural Gas (Portfolio F) – it did not use the updated natural gas and battery cost assumptions. ¹³ By relying instead on its original, rejected figures, Duke failed to present updated deep decarbonization portfolios to the Commission for review. ¹⁴

The failure to produce "2" versions of Portfolios D through F – that is, versions using Commission-directed pricing – is particularly troubling given the substantial increase in the volumes of battery storage added in these scenarios over the duration of the analysis period. Modified Portfolios D and E install 4,350 MW and Portfolio F installs 7,350 MW of energy storage, compared to 1,600 MW for updated Portfolio A and 3,400 MW for updated Portfolios B and C.¹⁵ Using rejected battery cost assumptions along with a potentially inappropriate sizing methodology (see below) substantially inflates costs for Portfolios D1, E1, and F, even though those portfolios are otherwise properly-modeled, compared to versions of those portfolios using the directed pricing and sizing. Because Duke did not include versions of these portfolios with updated battery costs, the Commission is unable to make an "apples-to-apples" comparison of all

¹³ DEC Modified IRP at 8.

¹⁴ While it did perform repricing sensitivities of these portfolios using the updated natural gas forecast, it did not reoptimize the portfolios' capacity expansion using the Commission-required natural gas forecast. DEC Modified IRP at 86.

¹⁵ DEC Modified IRP at 11. Figures represent the combined DEC and DEP system.

resource portfolios with respect to both costs and resource capacity additions. Given that there is a clear trade-off between additions of new batteries and additions of new gas-fired generators, lower storage costs in Portfolios D, E, and F will also likely result in even more battery additions and fewer new gas additions. The Commission should direct that Duke produce "2" versions of properly-modeled Portfolios D, E, and F.

The deep decarbonization portfolios (D, E, F) use less natural gas than the corresponding A, B, and C portfolios. Likewise, the "2" portfolios build substantially less natural gas generation than the "1" portfolios. By using Commission-rejected natural gas price forecasts, Duke's D1 and E1 portfolios likely overstate the amount of natural gas generation that would have been added in Portfolios D2 and E2 had they been modeled.

Furthermore, Duke's battery sizing methodology is flawed, resulting in an overbuild of battery capacity – and thus higher cost than necessary – relative to standard practice. ¹⁶ This too contradicts the Commission's directive. The Commission found that the "NREL ATB Low figures appropriately account for depth of discharge and degradation, and these figures represent a reasonable assumption for battery storage costs for use in the IRPs." This directive applied to both the capital costs and fixed operating and maintenance ("O&M") costs.

Yet the Company states that "[w]ith the exception of modifications to the battery storage cost forecasts, as described herein, the manner in which energy storage was incorporated into the SC Supplemental Portfolios is consistent with the September 2020 IRP." It is thus unclear whether Duke fully integrated the Commission's directives in its updated modeling, particularly with respect to the oversizing issue. The Commission should direct that Duke confirm that it did

¹⁶ See e.g. Revised Direct Testimony of Kevin Lucas on Behalf of the South Carolina Solar Business Alliance, Section III, Docket Nos. 2019-224-E and 2019-225-E.

¹⁷ Commission IRP Order at 77.

¹⁸ DEC Modified IRP at 46.

in fact modify its battery sizing methodology and use updated capital and fixed O&M costs, which already account for battery depth of discharge and degradation, to comply with the cost structure that is embedded in the NREL ATB costs.

Put together, Duke's failure to fully incorporate the Commission's directives on natural gas forecast prices and energy storage costs overstates the apparent cost of the deep decarbonization scenarios. This is particularly concerning given the 70% carbon reduction requirements that have recently been enacted by statute in North Carolina and are likely to impact Duke's South Carolina operations as well. ¹⁹ The PVRR data that Company does provide on Portfolios D1, E1, and F1 are inflated due to the use of rejected battery cost information. There are no "2" portfolios to compare what cost differences may exist to attain deeper carbon reductions compared to the A2, B2, and C2 portfolio.

Because Act 62 requires the selection of the "most reasonable and prudent" plan, the above failures are major flaws in the Company's Modified IRP. Prudence, indeed, dictates using accurate battery costs adjudicated by the Commission, and thereby avoiding the risk of high and volatile natural gas prices and potential regulatory costs. Duke's failure to comply with the plain language in the Commission's order hampers the ability of the Commission to determine whether Duke's preferred portfolio represents the most reasonable and prudent means of meeting its future energy and capacity needs.

IV. Duke's Arbitrary Limitation of PPA Capacity is Inappropriate

The Commission required Duke to model solar PPAs as a resource with a base price of \$38/MWh and a high-and low-price sensitivity of \$36/MWh and \$40/MWh, respectively.²⁰ The

¹⁹ N.C. Session Law 2021-165.

²⁰ Commission IRP Order, OPs 11 and 13.

Company did incorporate these resources in its updated modeling, but it also restricted the quantity of PPAs that could be selected to 50% of the 750 MW interconnection limit, resulting in higher costs when the model was forced to choose more expensive utility-owned solar in lieu of PPAs.²¹ It appears to have further limited PPAs to half of the incremental capacity above and beyond the "forced in" renewables, including the "undesignated" category from the original IRP.²²

The Company provides no justification for its choice to limit PPAs. The only discussion of this critical issue follows:

The Companies believe this balance between third-party solar and utility COS-solar is appropriate to ensure a diverse mix of renewable resource types available to customers. It would be imprudent to rely entirely on purchased power for any one resource type, including solar.²³

When asked for more detail about this issue in discovery, Duke offered a different explanation than stated in its Modified IRP Report. The Company cited a response to an ORS discovery request, which questioned the ability to source large quantities of PPAs at the \$38/MWh level but did *not* question the appropriateness of different types of ownership structures.²⁴

At any rate, calling out "resource diversity" as a justification for ownership limits regarding tranches of the *same* resource (solar pv) is a non sequitur. Resource diversity is typically examined from a resource adequacy and risk perspective. It is necessary to have sufficient resource diversity to create a robust system, but this metric is measured based on the operational characteristics of different physical resources (e.g., gas, nuclear, coal, hydro, storage,

²¹ DEC Modified IRP at 27.

²² DEC Modified IRP at 33.

²³ DEC Modified IRP at 27.

²⁴ Exhibit 1 (DEC/DEP Resp. to CCEBA First Set of Interr.)(*see* response to 1-7). Exhibit 2, (DEC/DEP Resp. to ORS AIR 7-17).

solar), not their ownership structure. There is no functional difference between a solar project owned by an independent power producer or by Duke – both contribute equally to resource diversity. Indeed, the only apparent difference is that Duke's systems are much more expensive than third-party PPAs. It is thus improper and contrary to least-cost planning to attribute "resource diversity" values to (more expensive) solar owned by Duke versus (less expensive) solar owned by third parties, and doing so charges Duke's customers more for the same product.

Duke's claim about imprudently relying on purchased power for any one resource type is also a red herring. Duke offers no support for this statement; if it could rely entirely on less expensive purchased power for its supply while maintaining the same level of reliability, why would it be imprudent? The Company appears to believe that purchased power is somehow inferior to company-owned generation. This is a non-trivial claim and would require substantial analysis to back it up. Duke offers nothing of the sort in its Modified IRP.

With regard to procuring PPAs at \$38/MWh, the Company notes that increasing land costs, supply chain constraints, and increasing labor costs could all contribute to higher PPA prices. ²⁵ Of course, these inflationary pressures would apply equality to utility-owned solar generation, so even if the costs of PPAs were to increase in the future, the delta between PPAs and utility-owned projects would likely remain. In fact, as discussed by ORS, the cost of utility-owned solar was "far higher" than \$38/MWh, leaving substantial headroom for PPA prices to increase and still be cost-effective compared to utility-owned solar. ²⁶

Significantly, Duke's modeling shows that the arbitrary limit placed on PPAs did indeed prevent the model from economically adding more PPAs, which it otherwise would have done.

As Duke states: "Notably, the selection of a solar PPA at \$38/MWh is *always* selected as soon as

²⁵ Exhibit 2.

²⁶ Commission IRP Order at 65.

it is available to the model."²⁷ Rather than let the model do the economic selecting, the Company forces the model to select thousands of MW of more expensive utility-owned solar.

The end result of this approach of inappropriately carrying over utility-owned "undesignated" solar capacity and limiting additional PPA capacity can be seen in Duke's preferred C1 portfolio, where Duke has prevented roughly 4,000 MW of PPA solar from being optimized by using artificial ownership limitations. Duke carried over its "designated", "mandated", and "unspecified" renewable addition categories (and their ownership structure) from its original IRP. Under this construct, Duke "forced in" large quantities of renewable capacity based on existing and planned programs such as CPRE and SC Act 236.²⁸ Because these resources are already included prior to the model's optimization and count towards the annual interconnection limit, there is less headroom for the model to select the most cost-effective resource – third-party PPAs – in the early years of the planning horizon.

While it is appropriate for Duke to continue forcing in the designated and mandated capacity, there is no justification for carrying over any undesignated portion of the capacity. These projects are by Duke's own definition "beyond what is already designated or mandated" and should instead be optimized by the model. Despite this, Duke assumes roughly 1,300 MW of "Undesignated Util COS Solar" will be added between 2024 and 2031.²⁹ This capacity takes up room under the interconnection limits and stifles the model's ability to fully optimize the portfolios with third-party PPA resources.

²⁷ DEC Modified IRP at 61.

²⁸ DEC Modified IRP at 33.

²⁹ DEC Modified IRP at 34.

More than one-third of the solar capacity additions in Portfolio C1 were placed outside the ownership optimization routine as shown by the blue and yellow segments in Figure 1 below.³⁰

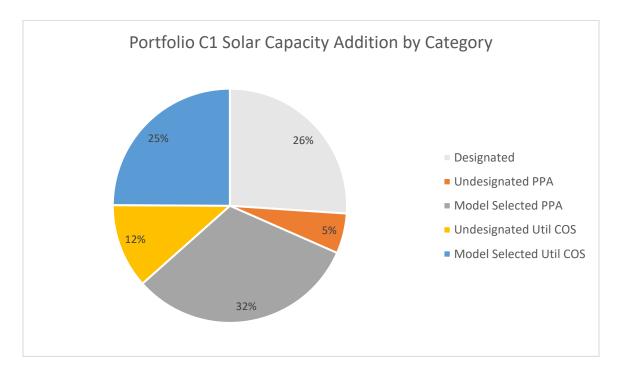


Figure 1 - Portfolio C1 Solar Capacity Additions by Category

Duke's limits contradict the Commission's order to model third-party PPAs as a resource in determining a least-cost plan. So that the Commission understands and can evaluate a true least-cost plan on a level playing field, it should require Duke to remove any ownership requirement for "undesignated" resources and allow the model to select third-party PPAs when it is most economic to do so regardless of ownership share.

³⁰ Analysis of Figure 2-B, DEC Modified IRP at 34.

V. Duke's Selection of its Preferred Portfolio is Inconsistent with the Commission's IRP Order

The Commission found that Duke was not in compliance with South Carolina statute when it failed to select any specific portfolio as its "preferred resource portfolio" and directed the Company to do so in its Modified IRP.³¹ The Company selected Portfolio C1, its Earliest Practicable Coal Retirement with Duke natural gas and storage costs, as its preferred resource portfolio. This selection is improper because it directly conflicts with the Commission's order to use a new natural gas price forecast methodology and updated battery costs.³²

This is not a trivial issue. South Carolina changed the laws that govern the utility IRP process, substantially increasing the level of rigor required in developing IRPs and transforming the regulatory review process from a "paper exercise" to one that has legitimate Commission oversight and authority. In particular, the statute authorizes the Commission to "modify" the IRP, which it did through its order. The Commission clearly and correctly interpreted its obligation under the statutes to enforce these new standards and ordered Duke to resolve many issues.

Duke's selection of the C1 portfolio too casually dismisses the intent of the Order, effectively neutering the Commission's directives and modifications. Duke cannot sidestep the clear intent of the Commission IRP Order. The Company was required to "remodel its portfolios" using updated natural gas and battery cost assumptions, and only portfolios that use the updated values should be considered responsive to the Commission's order and thus eligible for selection as a preferred resource mix. The Commission should require Duke to select as its preferred portfolio one of the "2" portfolios incorporating the Commission's rulings. If for some reason the Company cannot simply select C2 instead of C1 as its preferred portfolio, it should explain why.

³¹ Commission IRP Order at 85.

³² Commission IRP Order, OP 10 and 16.

³³ Commission IRP Order, OP 10.

VI. The Commission's Other Directives May Produce Additional Structural Changes to Optimized Portfolios

In addition to the numerous directives that the Commission explicitly required Duke to incorporate into its Modified IRP filing, it found several other areas in need of modification for future IRP updates and full IRP filings. Some of these, while not required in this docket, have the potential to induce sizable changes in optimized portfolios in future IRPs. The Commission should be aware of this and note that the adjustments required in the Modified IRP will likely produce some but not all of the changes that can be reasonably anticipated as a result of the entirety of its IRP Order. Those areas are described more fully below.

A. Effective Load Carrying Capacity

The Commission identified issues in the methodology that Duke used to calculate the ELCC of resources, particularly for solar, battery, and hybrid resources. The Commission identified numerous changes that it will require going forward which will likely lead to higher ELCC values for these resources.³⁴ Given the sizeable nameplate capacity of solar and storage that is anticipated to come online in the next decade, even small changes in the ELCC of these resources could materially increase their contribution towards reserve margin and produce a corresponding reduction in the need for other capacity resources, thereby eliminating redundancy in capacity resources and reducing costs for customer.

B. Gas Transportation

The Commission also required Duke in its next full IRP to "address the risks of natural gas transportation and delivery, including rejection of cancellation of pipeline projects; and shall quantitatively address the potential impacts of transport and delivery risk on natural gas

³⁴ Commission IRP Order, OP 6.

availability and pricing."³⁵ This topic was discussed in the current docket, with risks associated with transport and delivery of natural gas highlighted by the cancellation of the Atlantic Coast Pipeline and write-down of the Mountain Valley Pipeline. Shortly after the Commission IRP Order was issued, the U.S. Environmental Protection Agency requested that the U.S. Army Corps of Engineers deny a key construction permit for the Mountain Valley Pipeline, having identified "substantial concerns" with the environmental impacts, suggesting that the regulatory risk of that project continues.³⁶

While the Company will be required to address these issues in future IRPs, Duke maintained in the Modified IRP not only its assumption that firm fuel transport will be available with no price impact, but that currently-unbuilt pipeline capacity would enable even lower prices for its high capacity factor combined cycle plants. Duke's choice of the C1 portfolio essentially requires new pipeline infrastructure to fuel its natural gas expansion, an issue that is sidestepped in some of the deep decarbonization scenarios. The Commission already recognized these assumptions as "questionable", 37 and a likely result of an updated analysis would be higher transport costs for natural gas fuel. Given the importance of fuel costs on portfolio optimizations, future changes that appropriately price in pipeline delivery risk could impact future resource mixes.

C. Interconnection Limits

Although the Commission required the Company to increase its base annual interconnection limit to 750 MW in the Modified IRP, it also required Duke to justify any future interconnection limitations in a manner "that is analytically justified, nondiscriminatory, and

³⁵ Commission IRP Order, OP 8.

³⁶ https://www.enr.com/articles/52084-epa-asks-corps-to-reject-6b-mountain-valley-pipeline-key-permit

³⁷ Commission IRP Order at 54.

accounts both for the expected benefits of queue reform and the possibility of making future investments in Duke's capacity to study and interconnect new generation."³⁸ To comply with the recently passed North Carolina House Bill 951, which requires a 70% carbon emission reduction by 2030, Duke will unquestionably need to increase its ability to interconnect zero-carbon resources such as solar and wind.³⁹ As part of its efforts to comply with its new statutory emissions reductions, the Company will likely need to increase its annual interconnections beyond 750 MW per year. These improvements will be modeled in future IRPs and could result in faster renewable deployment than is contemplated in the Modified IRP.

D. Coal Unit Retirement Analysis

The coal unit retirement analysis presented by Duke in the 2020 IRPs is inconsistent with industry best practices and resulted in a suboptimal set of unit retirement dates. The Company's methodology was critiqued by several parties as it was not a true economic optimization of coal retirement dates. Duke's analysis first establishes a rank order for unit retirements that only considers unit capacity, retiring smaller units first, and ignores both the operating costs at the unit and the capital investments necessary to maintain the unit in the future. Second, Duke's "sequential peaker method (SPM)" compares each coal unit to a new combustion turbine, ignoring the question of whether other resource portfolios exist that could provide the same services at a lower cost. The Commission required Duke to "conduct a new analysis to determine the most economic retirement dates for the combined DEC and DEP fleet of coal plants, [] solicit parties' recommendations on guidelines for performing this analysis via the ongoing IRP stakeholder process and adopt a set of guidelines prior to development of the 2022 IRPs."

³⁸ Commission IRP Oder, OP 18.

³⁹ https://governor.nc.gov/news/press-releases/2021/10/13/governor-cooper-signs-energy-bill-including-carbon-reduction-goals-law

⁴⁰ Commission IRP Order at 17.

We recommend that Duke reassess its methodology and update its analysis in a way that demonstrates that both near- and long-term capital expenditures at the units are consistent with economically optimal plant lives. All forward-going costs, both avoidable costs at the units themselves and the costs of future replacement resources, must be correctly defined. While endogenous (internal to the model) retirement decisions can be made using the EnCompass modeling software, a unit-by-unit valuation lends transparency to the retirement valuation process, and the stacking of lowest value (least-economic) units can set Duke on a near-term, "no regrets" pathway.

An updated unit retirement analysis that follows these guidelines will almost certainly result in a unit retirement path that deviates from both Duke's "Most Economic" and "Earliest Practicable" pathways. We would then expect that replacement resources would look different in terms of type and quantity than they do in the buildouts that Duke has presented. To be consistent with Duke's new statutory carbon emission reduction requirements, these replacement portfolios will largely, if not exclusively, bemade up of zero-carbon renewable resources, demand-side management, and energy storage.

E. Energy Efficiency (EE) and Demand Side Management (DSM)

The Commission ordered Duke to make several changes to the ways in which it determines the appropriate level of savings to include in future IRPs and market potential studies. In these 2020 IRP Updates, the Company models only its deep decarbonization portfolios – D1, E1, and F1 – with an increased contribution from EE/DSM measures by 2035 relative to the various A, B, and C portfolios, which results in savings of 1,300 MW for DEC/DEP. Energy efficiency will be a critical component in any resource portfolio that

⁴¹ DEC 2020 IRP Update, Table 1-C, page 11.

includes an accelerated coal retirement path, whether that be Duke's "Earliest Practicable" schedule as presented in these Updates, or a schedule resulting from a revised unit retirement analysis. The absence of increased energy efficiency in the C portfolios, particularly C2, very likely results in an overbuild of supply-side generating resources at unnecessary costs to ratepayers. Incorporation of additional DSM measures in future IRPs will both promote cost savings and help to ensure reliability, particularly as aging fossil units are retired over time.

F. Each of these Adjustments Will Affect Future Duke IRPs

While the changes that the Commission required in the Modified IRP produced optimized portfolios with more solar and wind, more storage, and less natural gas capacity, the full impact of its order will only be realized in future IRPs. Pending changes related to ELCC calculations, natural gas transport and delivery risk, interconnection limitations, and coal retirements will have significant impacts on future modeling.

These potential changes will be critical as Duke's current portfolios continue to add substantial natural gas capacity. In fact, between 2020 and 2030, Portfolio C1 increases natural gas generation nearly twice as much as renewable generation. Duke projects an incremental 23.1 GWh coming from future natural gas plants compared to an incremental 12.9 GWh coming from future renewable projects, pushing the share of natural gas generation from 21.3% in 2021 to 34.1% in 2030.⁴² Given the recent, dramatic increase in natural gas prices, this buildout of natural gas generation could expose Duke's customers to major bill increases in future years. By contrast, the price for new renewable generation is often locked in through long-term contracts, offering a hedge against volatile fossil fuel prices. The Commission should recognize the

⁴² Exhibit 1, (see response to CCEBA Interrog. 1-9).

Modified IRP results as a step in the right direction while anticipating more dramatic changes in the future.

VII. Conclusion

In sum, in the Modified 2020 IRPs Duke appears to have gone through the motions of complying with some, but not all, of the Commission's directives by including some, but not all, of the mandated changes in some, but not all, of its modeled portfolios. Duke then selected a portfolio that does not comply with clearly-stated Commission requirements. As a result, the Modified IRPs, while marginally different from the original IRPs, continue to show unmerited preference for gas generation and utility-owned resources over more economic resources that fulfill Act 62's mandate for renewable generation and the most reasonable and prudent approach. The Intervenors recommend that the Commission take the following actions with respect to the Modified IRP:

- Require Duke to model all portfolios with the Commission-required natural gas and battery cost forecasts
- Reject Duke's selection of Portfolio C1 as its preferred portfolio as that portfolio
 uses natural gas and battery cost assumptions the Commission rejected as
 unreasonable
- Require Duke to select a preferred portfolio that is in full compliance with the Commission's order
- Confirm that Duke changed its battery sizing methodology to conform with the costs from the NREL ATB report
- Require Duke remove the arbitrary 50% limitation on least-cost third-party PPAs

Respectfully submitted, this 26th day of October 2021.

[Signature Page Follows]

/s/Richard L. Whitt Whitt Law Firm, LLC, 401 Western Lane, Suite E Irmo, South Carolina, 29063 (803) 995-7719.

/s/John D. Burns

General Counsel, Carolinas Clean Energy Business Association, 811 Ninth Street, Ste. 120-158 Durham, North Carolina 27705 (919) 306-6906 Admitted *Pro Hac Vice*.

Both as Counsel for, Carolinas Clean Energy Business Association.

/s/Kate Lee Mixson, Southern Environmental Law Center 525 East Bay St., Suite 200 Charleston, South Carolina 29403 (803) 720-5270.

As Counsel for South Carolina Coastal Conservation League, Southern Alliance for Clean Energy, and Upstate Forever, Sierra Club and Natural Resources Defense Council.